LAND USE

Historic Land Cover/Land Use

Historical land cover within the uplands of the South Grand Watershed primarily consisted of prairie with oak savannas and open oak woodlands in the more dissected areas along and near streams (Figure Lu01) (MDC 1998b). In the portion of the watershed which is now in the area of lower Truman Reservoir, a landscape more typical of the Ozarks was present. The uplands were dominated by oak savanna and open oak woodlands. Scattered dolomite and sandstone glades as well as occasional prairie openings were also originally present in this area (MDC 1998b).

Historic land cover in the wide alluvial plains in the valleys of some of the larger streams in the watershed such as the South Grand River, Big Creek, and Deepwater Creek, included a large amount of bottomland prairie with numerous wetlands such as marshes, shrub swamps, and oxbow lakes. Bottomland forests were also present especially in more elevated, well drained valleys. (MDC 1998b)

Prehistoric peoples of the Native American Indian tribes were the first to inhabit the region of the South Grand Watershed. Tribes inhabiting the region at the time the first Europeans arrived were primarily the Shawnee, Kickapoo, and Osage. The Osage were the last tribe to be present in the area. The Osage people lived in villages and subsisted by hunting, foraging, and small scale agriculture (Sabo 2001). Fires, a significant factor in shaping the Pre-European landscape of the region in and around the watershed, were often set by the Osage during the fall hunting season (Aldrich 1955).

The French were the first Europeans to explore and inhabit Missouri (Rafferty 1983). Initial exploration and settlement occurred in the late 1600s and early 1700s. Early settlement was confined primarily to the areas on the western bank of the Mississippi River and the Missouri River near the mouth as well as the lead belt south of St. Louis. The quest for fur brought the French up the Missouri River Valley and resulted in the establishment of Fort Orleans (near present day Brunswick) in 1722 (Rafferty 1983).

With the eminent loss of French territory east of the Mississippi River to the English as a result of the French and Indian War, France transferred the remaining Louisiana Territory to it's ally Spain in 1762. This not only prevented the English from gaining the territory, but also relieved the French of a territory that had generated less revenue than was required to govern it (Meyer 1982). In 1770 Spain took formal control of the territory.

The portion north of the Arkansas River (which included present day Missouri) was governed by Spanish lieutenant governors in St. Louis who in turn received their direction from New Orleans (Rafferty 1983). While Spanish governance was authoritarian, lacking jury trial and law by popular assembly, it seemed to have little effect on the "cultural continuity" of the area (Rafferty 1983). Initially, the French continued to account for most of the migration to the region. In the late 1780s, Americans from the east began to move into the region. By the year 1800, Americans outnumbered the French in Missouri

(Rafferty 1983).

In 1800, the Louisiana Territory was ceded back to France by Spain. Three years later France, in need of additional finances to further it's military needs, sold the territory to the United States for a sum of \$11,250,000 (Collins and Snider 1955). This came to be known as the Louisiana Purchase.

The Expedition of Lewis and Clark in 1804 served, among other things, as a catalyst to the westward expansion of settlement. In Missouri, settlement continued to occur up the major rivers. The river bottoms provided timber for construction and fertile ground for agriculture. The Osage River had become a navigation route by 1830 with ports at Osceola and Warsaw (Rafferty 1983). As lands became more expensive and scarce along the large rivers, settlement gradually moved up the smaller river bottoms and eventually into the prairie uplands.

Sources of settlement in the South Grand Watershed were probably the expansion of settlement out of the Missouri River Corridor as well as settlers coming up the Osage River. Initially, the prairie uplands of the region including the South Grand Watershed were not considered fertile by many early settlers, many of whom came from forested areas east of the Mississippi River. This misconception coupled with a lack of timber for construction, as well as a lack of water, were factors in the relatively late settlement of the uplands (Aldrich 1955).

Early settlers in the region relied on small scale or subsistence agriculture, hunting, and fishing for survival. Early agriculture in the region was less specialized as relative isolation required settlers to raise a variety of crops for use by the immediate household (Rafferty 1983). While corn and wheat were the main crops; cotton, flax, hemp, and tobacco were also produced by early settlers (Meyer 1982 and Rafferty 1983). Due to the fact that most early settlers practiced farming on a subsistence scale, cultivated areas were probably relatively small and isolated. In addition to crops, early settlers also often raised a variety of livestock. These included horses, mules, sheep, cattle, and chickens. Unlike present practices where fencing is constructed to keep livestock in an area, early fences were usually constructed to keep livestock out of areas such as the garden (Meyer, 1982). Thus, for the most part, early livestock were free-ranging.

As transportation improved with the coming of the railroad as well as road improvement, the ability to exchange cash and goods increased. This led to a shift from subsistence farming to cash farming and agricultural specialization. In addition, post-civil war advances in agricultural implements allowed for the more efficient cultivation and harvesting of larger acreages of crops. These factors led to the farming of larger acreages (Figure Lu02). Livestock populations also increased dramatically between 1850 and 1880.

As river bottom land became harder to find and farm acreage increased, the demand for upland prairies increased. Encroachment on the uplands resulted in the replacement of native prairie vegetation with domestic legumes and grasses such as clovers, timothy, blue grass, and alfalfa (Aldrich 1955). Livestock raising in the region became increasingly important in the region. This is illustrated by the substantial rise in livestock numbers in Bates, Cass, and Henry Counties between 1850 and 1880 (Figure Lu03).

Increased settlement and agricultural expansion in the watershed, led to the efforts to increase drainage and protect property from flooding. These efforts came in the form of channelization of streams and construction of levees with a large portion of the South Grand being channelized between the years 1914 and 1919 (Gosnell 2002).

In addition to livestock raising and cropping, several non-agricultural industries also existed in the area in the late 1800s and early 1900s. These included coal mining as well as clay mining.

Changes in human populations between 1900 and 1990 differ substantially between counties intersecting the South Grand Watershed (Figure Lu04) (OSEDA 1998). Half of the counties experienced a net decline in population, while the other half experienced growth. St. Claire County experienced the largest percentage of population decline at -52.8%. Other counties which experienced declines include Bates (-50.2%), Benton (-16.3%), and Henry (-28.6%). Jackson County experienced the largest rate of growth at 224.4%. Other counties which experienced growth include Cass (170.0%), Johnson (52.7%), and Pettis (9.2%).

The 2000 human population within the South Grand Watershed was estimated to be 110,855 persons. Population density in 2000 was approximately 54 persons per square mile as compared to the overall population density for Missouri which was approximately 81 persons per square mile (Figure Lu05). Of course, one must take into account the effect of the states urban centers on this estimate.

Projections of human population increase of Missouri counties have been calculated by the Missouri Office of Administration (MOA), Division of Budget and Planning for three different projection scenarios in a report entitled Projections of the Population of Missouri Counties By Age, Gender, and Race: 1990 to 2020 (MOA 1994). Differences in the scenarios are based on migration trends. Scenario L takes into account long term (1980-1992) migration; Scenario R takes into account recent (1987-1992) migration; and Scenario Z assumes zero migration. Combined population estimates from 1990-2020 for those counties intersecting the South Grand Watershed have been used to calculate percent increase in population for all three scenarios. Scenarios L, R, and Z project a combined population increase rate of 4.6%, 4.2, and 14.3% respectively by the year 2020. Table Lu01 lists projected population and overall population growth rate for individual counties for all three scenarios

Ecological Classification

The Ecological Classification System (ECS) is a management tool which provides a means of "describing distribution of current and potential natural resources in a manner that considers land capability upfront" using a knowledge of landform, geology, soils, and vegetation patterns (MDC 1997). There are several levels of classification within the ECS. For purposes of this document the three lowest levels are dealt with. These levels are section, subsection, and land type association (LTA), with section being the largest, most encompassing level and LTA being the smallest. The South Grand Watershed intersects two sections, 3 subsections, and 11 LTAs (Figure Lu06).

The sections intersected by the South Grand Watershed in Missouri include the Osage Plains Section and the Ozark Highlands Section. Most of the watershed (96.9%) occurs within the Osage Plains Section. This section consists of an unglaciated prairie plain underlain by limestone, sandstone, and shale of Pennsylvanian age. Topography of this section is flat to gently rolling with extensive wetlands associated with the Upper Osage Basin. Historic land cover of this section consisted of tallgrass prairie (MDC 1998b).

Only a relatively small portion (3.1%) of the watershed occurs within Ozark Highlands Section. The Ozark Highlands Section consists of very old and highly weathered plateaus which, coupled with its physiographic diversity and central geographic location relative to the continent, has created a region of

unique ecosystems harboring many endemic species (MDC 1997).

The subsections intersected by South Grand Watershed include the Scarped Osage Plains, Cherokee Plains, and the Osage River Hills (Table Lu02):

The Scarped Osage Plains Subsection

"Consists of a series of alternating shale plains and limestone scarps that, in a broad sense, stair-step down in elevation from northwest to southeast. The flatter plains were nearly continuous tallgrass prairie originally, while the scarped limestone areas were more dissected and a mosaic of prairie and savanna. Valleys are narrower as they flow through the limestone scarps than they are in the Cherokee Plains to the southeast" (MDC 1998b).

The Cherokee Plains Subsection

"Is a lower and generally flatter plain underlain by sandstone and shale. Also nearly continuous tallgrass prairie originally, it has very broad alluvial floodplains with extensive wetland complexes in the Upper Osage River Basin" (MDC 1998b).

The Osage River Hills Subsection

"Encompasses the rolling to ruggedly dissected landscape carved by the Osage River and its tributaries. The western part of the hills are cut into the Jefferson City-Cotter Dolomite, which often yields shallow, cherty soils that support oak savannas and open oak woodlands, and dolomite glades..." (MDC 1998b).

Land Type Associations (LTAs) represent the smallest of the three previously mentioned levels (Figure Lu06). LTAs intersecting the South Grand Watershed and percentages of the watershed intersected include the following:

Belton High Prairie Plain 4.8%

Inner Osage Prairie/Savanna Scarped Plains 17.1%

Jackson Co. Prairie/Woodland Scarped Plain 0.1%

Osage Prairie Plains 15.0%

Outer Osage Prairie/Savanna Scarped Plain 17.9%

Scarped Osage Plains Alluvial Plains 5%

South Grand Alluvial Plains 6%

South Grand Smooth Low Prairie Plains 23.7%

Southern Pettis Co. Prairie Plain 0.3%

Truman Lake Oak Woodland Hills 3.1%

Windsor Prairie/Savanna Dissected Plain 7.0%

The Ecological Classification System could prove to be a useful tool for planning and

implementing management activities by providing an indication of what natural resource management options will be more adapted to specific areas thus increasing the success of management decisions as well as helping to ensure that management decisions are <u>ecologically</u> enhancing.

Current Land Cover

Approximately 52.2% of the South Grand Watershed is grassland based on analysis of MoRAP (1999) Missouri land cover data and KARS (1993) Kansas land cover data. Crop land is the second most prevalent land cover accounting for approximately 26.5% of the total watershed area, while forest is third at 18.2 %. The land cover categories of wetland and water each account for approximately 0.1% and 2.7% respectively. The presence of Truman Reservoir accounts for a large portion of the latter percentage. In addition, urban land cover accounts for approximately 0.4% of the total watershed area (Table Lu03, Figures Lu07and Lu08). Grassland is the most dominant land cover type in all eleven digit hydrologic units within the watershed with the exception of Camp Branch which has slightly more crop land (44.3%) than grassland (44.1%). The Truman Reservoir-South Grand unit has the highest percentage of forest cover at 30.11%, while the Camp Branch unit has the lowest at 10.6%. It is important to note that National Wetlands Inventory data as well as anecdotal evidence suggests that the percentage of watershed area in wetlands is substantially higher than the land cover data indicates. This is especially true in the lower portions of the South Grand River and Big Creek (Bayless, Personal Communication).

Soil Conservation Projects

Three Special Area Land Treatment Projects (SALT) have been completed within the South Grand Watershed (Figure Lu09) with 11,013 acres being treated. Within the watershed a total of 21,753 acres are currently (2002) enrolled in the Conservation Reserve Program (CRP) or Conservation Reserve Enhancement Program (CREP) (Figure Lu09) (FSA 2002). The Lower Big Creek Eleven Digit Hydrologic Unit contains the highest percentage of land enrolled in CRP/CREP at 3.5% (4,555 acres); while the Upper Big Creek and Crawford Creek Units contain the lowest percentage with each containing 0.7% (639 and 348 acres respectively). In addition, there are currently 1,673 acres enrolled in the Wetlands Reserve Program within the South Grand Watershed (NRCS 2003).

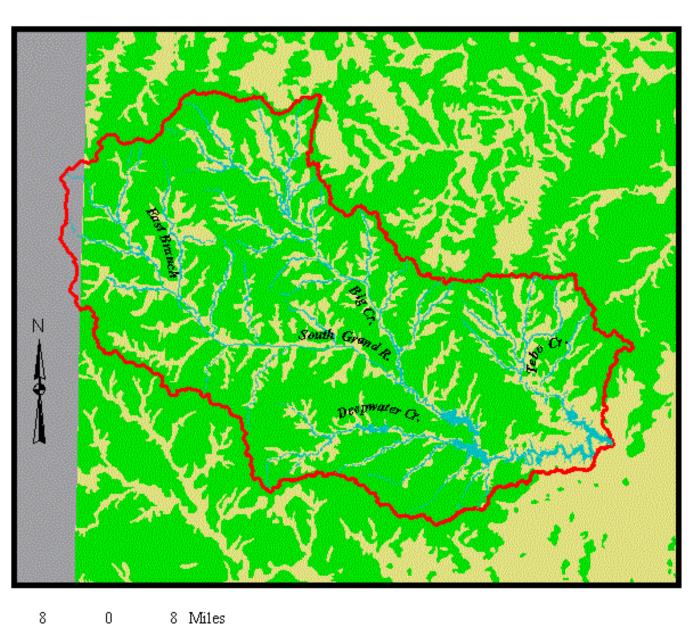
Public Land

Knowledge of land ownership within a watershed is an important key to understanding various characteristics of a watershed as well as addressing watershed related issues and concerns. Within the South Grand Watershed (Missouri), 6.6 % (86,597 acres) of land is under public ownership (Table Lu04 and Figure Lu10). An additional 2,376 acres is leased by the MDC from Kansas City Power and Light. The United States Corps of Engineers (USCOE) holds the largest amount of publicly owned land totaling 72,001 acres; 30,807 acres of which is leased by the MDC. The USCOE land is associated with the Truman Reservoir Project and is located in the lower portion of the watershed. In addition, the MDC owns 13,279 acres within the watershed while the MDNR owns 1,317 acres.

Analysis of land ownership percentages within eleven digit hydrologic units reveals that units in

the lower portions of the South Grand Watershed have the highest percentage of publicly owned land nearly all of which is USCOE land associated with Truman Reservoir. The Truman Reservoir/South Grand Unit has the highest percentage of public land at 30.9% (Table Lu05 and Figure Lu11). Most of this land is owned by the USCOE as part of the Truman Reservoir Project. Three units contain no public land in Missouri. These include Crawford Creek, Camp Branch, and Honey Creek. The public land within the watershed includes approximately 20.6 miles of permanent streams and 3 public stream accesses, only one of which has a developed boat ramp. No comprehensive statewide public land data is currently available for Kansas.

Figure Lu01. South Grand River Watershed Pre-Settlement Prairie



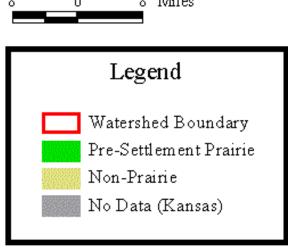


Figure Lu02. Historical estimates of harvested acres of major grain crops in Bates, Cass, and Henry Counties in Missouri (MASS 2002).

Acres Harvested

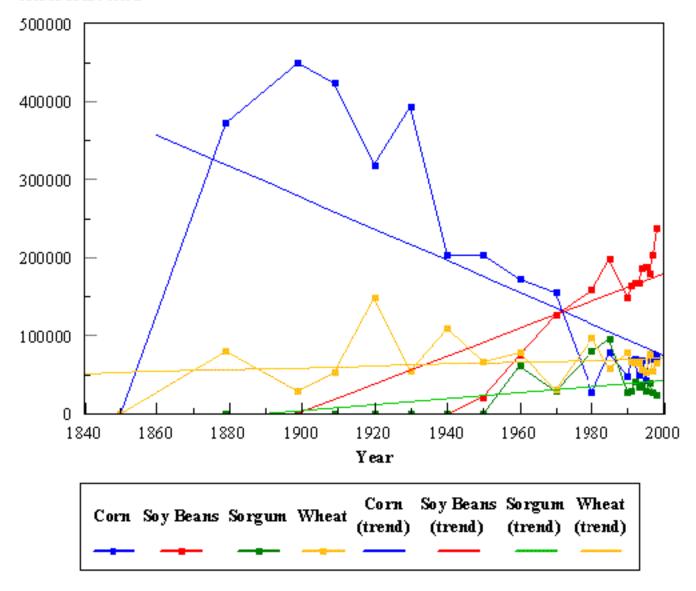
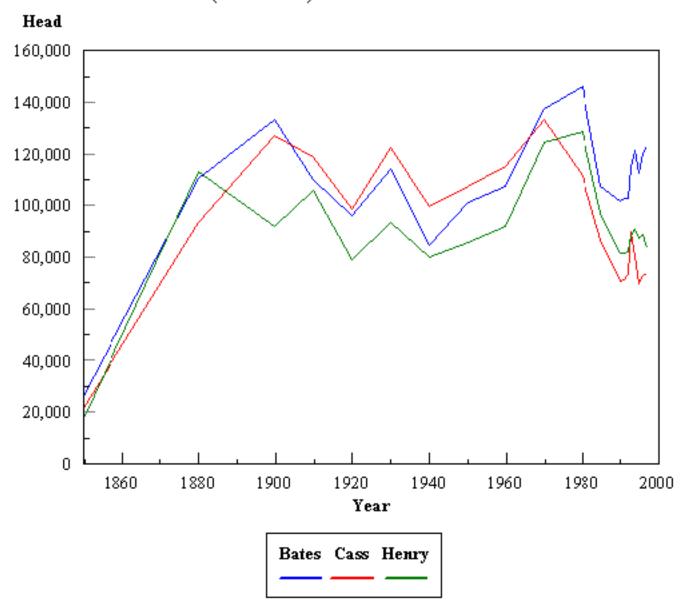


Figure Lu03. Cattle and hog population trends for Bates, Cass, and Henry Counties in Missouri (MASS 2000).



FigureLu04 Human population trends for counties intersecting the South Grand Watershed (OSEDA 1998). Percent overall population change given in parenthesis.



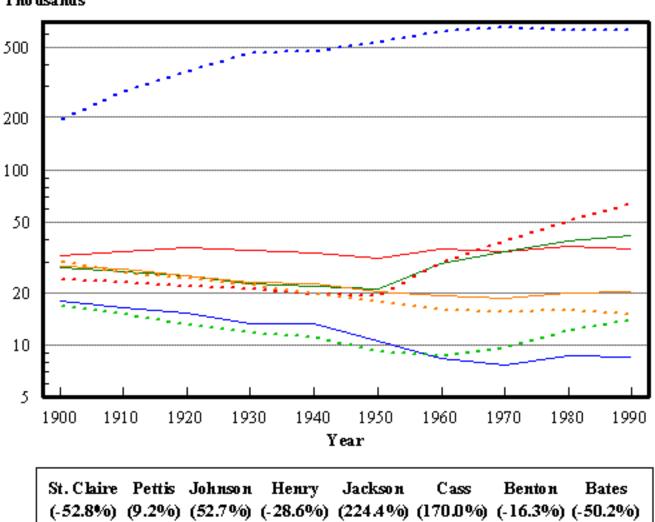
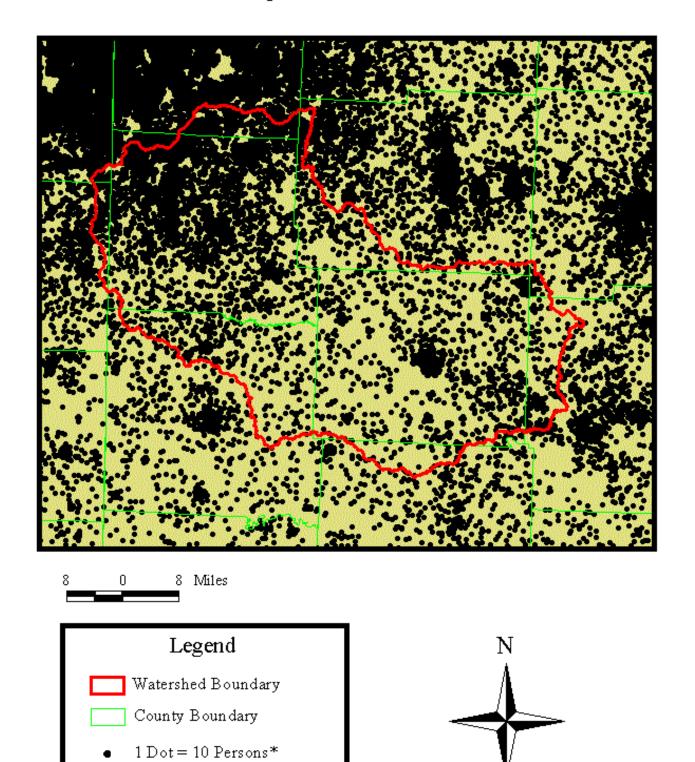


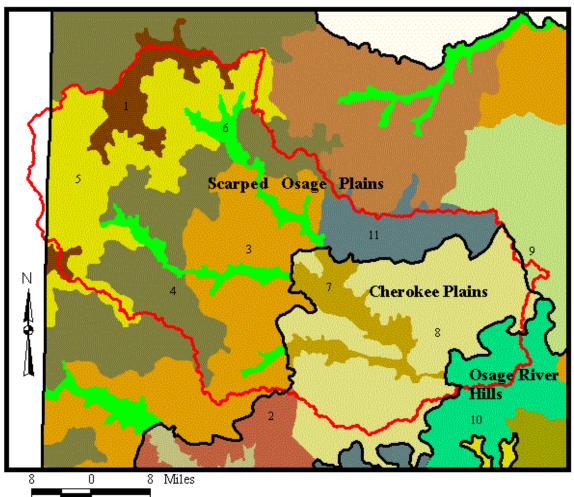
Figure Lu05. South Grand River Watershed Population Distribution



*Based on census blocks. Blocks with less than 10 persons are blank.

Figure Lu06. South Grand River Watershed





Legend				
Watershed Boundary	Ecological Subsection Boundary (Based on MoRap 1997)			
Land Type Association(Bas	ed on MoRap 1997)			
4. Osage Prairie Plains 5. Outer Osage Prairie 6. Scarped Osage Plain 7. South Grand Alluvi 8. South Grand Smoot 9. Southern Pettis Co. 10. Truman Lake Oak 11. Windsor Prairie/Sa	rairie Plains (<0.1%) /Savanna Scarped Plains (17.1%) s (15%) s/Savanna Scarped Plain (17.9%) ns Alluvial Plains (5%) al Plains (6%) th Low Prairie Plains (23.7%) Prairie Plain (0.3%) Woodland Hills (3.1%) avanna Dissected Plain (3.1%) Watershed (Missouri) intersected by			

Figure Lu07. South Grand River Watershed Land Cover

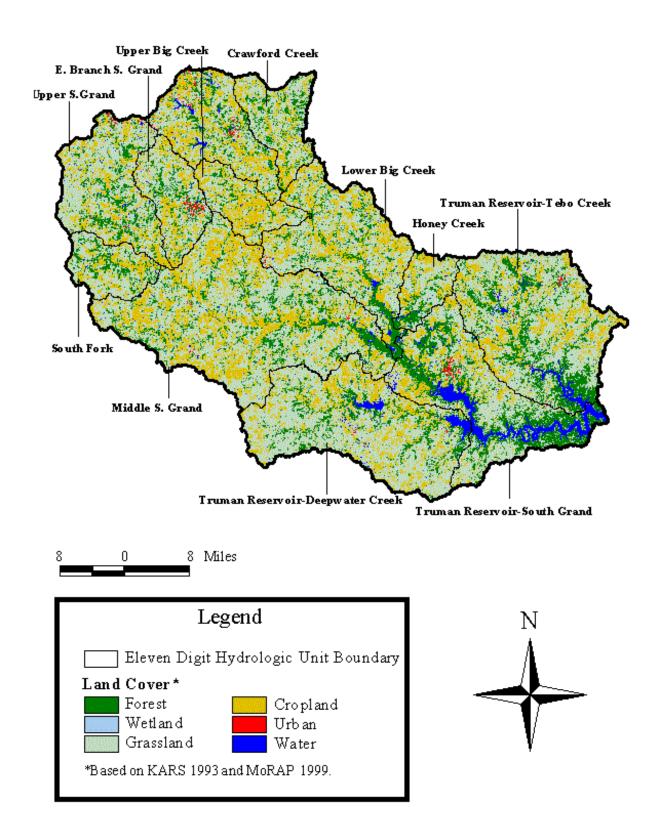


Figure Lu08 South Grand River Watershed Eleven Digit Hydrologic Unit Land Cover

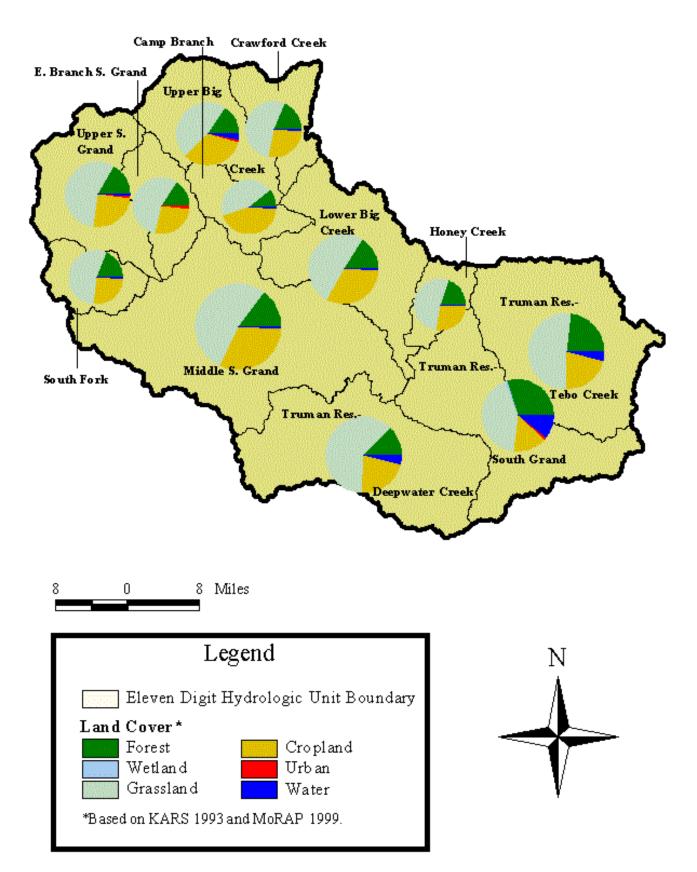
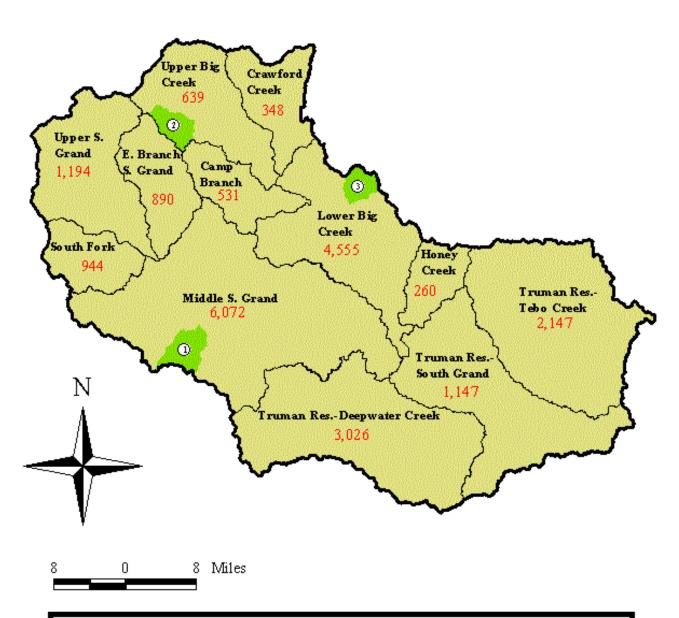


Figure Lu09. South Grand River Watershed Soil and Water Conservation Projects

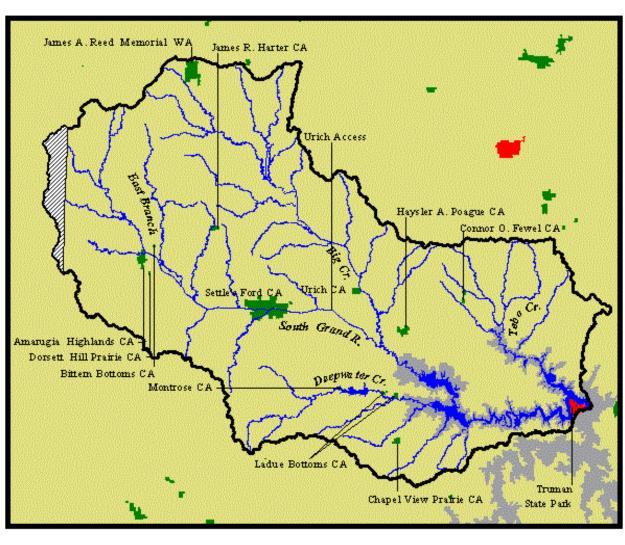


Legend

0000 Active contract acres of CRP/CREP

- Special Area Land Treatment (SALT) Project
- 1. Big Deer Creek-Acres Treated: 3,253; Date Completed: 6/1994
- 2. Lake Harrisonville-AcresTreated: 3,533; Date Completed: 6/1992
- 3. Pleasant Shade-Acres Treated: 4,227; Date Completed: 6/1992

Figure Lu 10. South Grand River Watershed Public Land



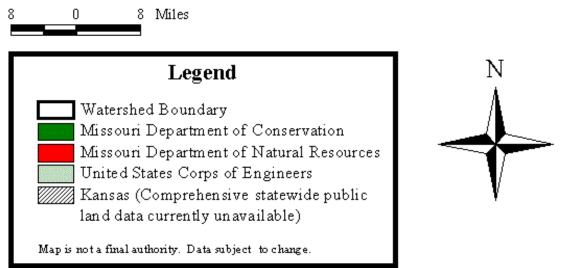


Table Lu01. Population projections from 1990 to 2020 for counties intersecting the South Grand Watershed (MOA 1994).

County/Scenario	1990	2000	2010	2020	Growth %
Bates/L	15,025	14,298	13,842	13,497	-10.10
Benton/L	13,859	15,421	16,404	16,629	19.99
Cass/L	63,808	76,463	87,322	95,875	50.26
Henry/L	20,044	20,465	20,828	20,923	4.39
Jackson/L	633,232	629,486	624,909	626,649	-1.04
Johnson/L	42,514	46,604	50,327	54,152	27.37
Pettis/L	35,437	34,844	34,597	34,802	-1.79
St Clair/L	8,457	8,398	8,351	8,251	-2.44
Total/L	832,376	845,979	856,580	870,778	4.61
Bates/R	15,025	14,357	13,946	13,632	-9.27
Benton/R	13,859	16,502	18,316	19,077	37.65
Cass/R	63,808	79,104	92,299	102,654	60.88
Henry/R	20,044	20,529	20,948	21,083	5.18
Jackson/R	633,232	619,208	605,643	600,237	-5.21
Johnson/R	42,514	50,787	58,115	64,748	52.30
Pettis/R	35,437	35,781	36,337	37,185	4.93
St Clair/R	8,457	8,719	8,938	9,019	6.65
Total/R	832,376	844,987	854,542	867,635	4.24
Bates/Z	15,025	14,901	15,158	15,502	3.17
Benton/Z	13,859	13,123	12,435	11,809	-14.70
Cass/Z	63,808	67,914	72,124	75,341	18.07
Henry/Z	20,044	19,779	19,900	20,199	0.77
Jackson/Z	633,232	668,397	696,258	725,595	14.59
Johnson/Z	42,514	46,774	51,090	56,135	32.04
Pettis/Z	35,437	36,358	37,452	38,624	8.99
St Clair/Z	8,457	8,264	8,254	8,381	-0.90
Total/Z	832,376	875,510	912,671	951,586	14.32
Average	832,376	855,492	874,598	896,666	7.66

Table Lu03. Percent land cover for eleven digit hydrologic units within the South Grand Watershed. Data is based on KARS Kansas Land Cover Data (1993) and MoRAP Missouri Land Cover Data (1999).

Unit Name	FOR	WET*	GRAS	CRP	URB	WAT
Upper South Grand	17.47	0.01	56.15	24.80	0.57	1.00
South Fork	19.20	0.00	54.37	25.80	0.00	0.62
East Branch South Grand	16.18	0.00	54.73	26.67	1.70	0.72
Upper Big Creek	16.06	0.00	45.88	34.17	1.46	2.42
Crawford Creek	18.91	0.00	53.43	27.15	0.05	0.47
Camp Branch	10.61	0.00	44.08	44.39	0.03	0.90
Middle South Grand	14.52	0.00	53.39	31.36	0.11	0.62
Honey Creek	19.81	0.00	52.02	26.70	0.00	1.47
Lower Big Creek	16.06	0.00	50.95	31.65	0.09	1.25
Truman Reservoir-Deepwater Creek	13.30	0.27	60.87	22.44	0.12	3.00
Truman Reservoir-Tebo Creek	22.87	0.26	52.32	21.43	0.21	2.91
Truman Reservoir-South Grand	30.11	0.58	41.89	15.27	0.66	11.49
South Grand Watershed	18.12	0.14	52.20	26.45	0.36	2.73

FOR =Forest, WET=Wetland, GRS=Grassland, CRP=Cropland, URB=Urban, WAT=Water

* It is important to note that National Wetlands Inventory data as well as anecdotal evidence suggests that the percentage of watershed area in wetlands is substantially higher than the land cover data indicates. This is especially true in the lower portions of the South Grand River and Big Creek (Bayless, Personal Communication)

Table Lu02 (1 of 4). Descriptions of land type association (LTA) groups and condensed descriptions of the 11 LTAs (underlined in bold) within the South Grand Watershed. Descriptions and diagrams are in part or whole from MDC (1998b).

Alluvial Plains Group

<u>Landform</u>: The Alluvial Plains group represents the broad floodplains of the Osage and South Grand Rivers. The floodplains included in this group are at least on mile wide with essentially no local relief other than that associated with terraces.

Geology: N/A

<u>Soils</u>: Soils are, for the most part, very deep and formed in alluvial materials of variable loamy, sandy, silty, and clayey textures. Both moderately drained and poorly drained hydric soils are common. The rivers have been extensively channelized and siltation related to agricultural runoff is prevalent.

<u>Historic Vegetation</u>: Historic vegetation included extensive bottomland prairie (39-54%) and numerous wetlands, including marshes, shrub swamps, and oxbow lakes. Substantial bottomland forest also occured, especially on the higher, more well drained bottoms. Flooding and fire were important disturbance regimes which created and maintained a unique and diverse ecosystem.

Current Conditions: Current land cover varies with LTA. The Scared Osage Alluvial Plains support extensive row crop agriculture (57%). In the South Grand and Four Rivers Alluvial Plains LTAs, extensive flooding and wetlands are more common. Consequently, cropland cover is lower (20-30%) and forest (28-33%) and water (17-19%) cover is higher. Widespread channelization, draining and levee systems are in place throughout, altering the natural hydrology and stream quality. While there are more remaining wetlands in these LTAs than the others, most have been drained or eliminated and existing wetlands suffer from severely altered hydrology, siltation, and agricultural runoff.

Scarped Osage Alluvial Plains: Valleys more narrow with higher gradient streams and more extensive cropland.

South Grand Alluvial Plains: Very broad bottoms; Truman Lake high water zone; some large blocks of remaining timber.

Table Lu02 (2 of 4). Descriptions of land type association (LTA) groups and condensed descriptions of the 11 LTAs (underlined in bold) within the South Grand Watershed. Descriptions and diagrams are in part or whole from MDC (1998b).

Prairie Plains

<u>Landform</u>: The Prairie Plains consist of broad flat uplands sloping gently down to very broad and flat bottoms. Local relief is less than 75 feet. Streams are mainly low gradient.

Geology: Geology primarily consists of Pennsylvanian limestone, sandstone, or shale overlain by a layer of loess.

<u>Soils</u>: Soils are primarily deep and somewhat poorly drained, especially on the smoothest landscapes. Streams deeply entrenched in silty substrates.

<u>Historic Vegetation</u>: The Prairie Plains represented some of the largest, most continuous expanses of prarie in Missouri. Historic prairie cover was greater than 80% for most LTAs in this group. Savannas occurred as isolated groves or narrow ribbon-like areas along streams. Wetlands occurred in lower more poorly drained areas.

<u>Current Conditions</u>: Currently the Prairie Plains consist of a mosaic of cropland and grassland. The grasslands are primarily fescue pasture and hay land. Less than 15% of these LTAs are timbered. Areas that are timbered consist primarily of invasive tree species such as elm, hackberry, and shingle oak. Few quality native prairies or oak savannas are known. Existing prairie remnants are traditionally native prairie hay meadows. Streams are often deeply encised and suffer heavy siltation and altered hydrology.

Belton High Prairie Plain: High, flat, loess covered upland divide at the head of the South Grand River drainage.

Four Rivers Low Prairie Plains: Low plains flanking the middle Osage River and tributaries. These plains occur mainly on shale.

Osage Prairie Plains: The flattest upland surfaces within the Scarped Osage Plains subsection. These occur mainly on Kansas City shale and limestone.

South Grand Smooth Low Prairie Plains: Low, very flat plains flanking the lower South Grand and occurring mainly on shale.

Southern Pettis County Prairie Plain: At the edge of the Ozarks with portions underlain by Jefferson City-Cotter dolomite and having common prairie remnants. Very little of this LTA occurs within the South Grand Watershed.

Table Lu02 (3 of 4). Descriptions of land type association (LTA) groups and condensed descriptions of the 11 LTAs (underlined in bold) within the South Grand Watershed. Descriptions and diagrams are in part or whole from MDC (1998b).

Scarped and Dissected Prairie/Savanna Plains Group

<u>Landform</u>: Rolling to moderately dissected topography with local relief between 75-150 feet. Broad, flat divides give way to more rolling and dissected lands with gentle sideslopes and moderately broad stream valleys.

Geology: Geologic parent materials are Pennsylvanian-aged limestones, shales and sandstones.

Soils: Soils are variable, ranging from shallow to bedrock, to deep, well drained, sandy loams. Numerous streams with variable gradient and substrates occur.

<u>Historic Vegetation</u>: Originally, prairie dominated the higher, flatter ground and graded into oak savanna and open oak woodlands in the more dissected areas near streams. Historic fire as well as grazing by bison, elk, and deer likely played and important role in maintaining the prairie and open woodlands.

Current Conditions: These LTAs currently have the largest blocks and greatest acreage of existing grassland with approximately 40-55% of the land cover being grassland. Most of this grassland consists of fescue pasture and hayfields. The remainder of the land in these LTAs consist of cropland (29%) or forest (21%). Cropland is mainly in smaller and more fragmented blocks than in the Prairie Plains. The dense second growth woodlands have been over grazed and in the absence of fire have very little ground flora. Stream quality varies, but some of the least altered streams occur in these LTAs.

Inner Osage Prairie/Savanna Dissected Plain: Scarped limestone dissected plain along the boundary of the Osage and Cherokee Plains.

Outer Osage Prairie/Savanna Dissected Plain: Scarped limestone dissected plain at outer edge of Osage Plains.

Windsor Prairie/Savanna Dissected Plain: Similar to, but less dissected and scarped than the Inner Osage Scarped Plain.

Table Lu02 (4 of 4). Descriptions of land type association (LTA) groups and condensed descriptions of the 11 LTAs (underlined in bold) within the South Grand Watershed. Descriptions and diagrams are in part or whole from MDC (1998b).

Ozark Oak Woodland Hills

<u>Landform</u>: Gently rolling to well-dissected hills with 150-250 feet of local relief. Broad ridges give way to moderately steep sides slopes (<25%) and moderately broad to rather narrow, entrenched valleys.

Geology: Cherty Mississippian limestones in the highest parts of the landscape with the stream valleys cutting through it into Jefferson City-Cotter dolomite.

Soils: Soils are often very cherty and shallow to moderately deep, with frequent bedrock outcrops. Streams are mainly moderate in gradient and widely meandering in moderately broad to narrow valleys with gravel and bedrock substrates.

<u>HistoricVegetation</u>: Oak savanna and open oak woodlands dominated the uplands, with dolomite and sandstone glades and occasional prairie openings scattered throughout. Fires from the prairie country to the west likely swept frequently through these woodlands and played and important role in their maintenance. Oak forest was confined to the steepest, most protected areas.

Current Conditions: A high percentage of these LTAs (57%) are currently forest consisting mainly of the post oak-black oak and mixed forest types. Substantial cedar-hardwood forest on shallow glade and woodland soils occurs, especially in the Lower Osage and Pomme de Terre Hills. Grassland makes up about 30% of these LTAs; less than 10% cropland occurs. Former savannas and woodlands are now dense, with a sparse ground flora. Most glades are overgrown with eastern red cedar. Streams are generally high quality with minimum impact relative to the prairie streams to the west.

Truman Lake Oak Woodland Hills: Rolling hills surrounding much of the main body of Truman Lake.

Table Lu04. Public lands within the South Grand Watershed. Acreage and permanent stream mile estimates are approximate.

Area Name	Owner ¹	Acres*	Permanent
			Stream Miles
Amarugia Highlands CA	MDC	1,039	0.5
Bittern Bottoms CA	MDC	63	0.0
Chapel View Prairie CA	MDC	384	0.0
Conner O. Fewel CA	MDC	324	0.0
Dorsett Hill Prairie CA	MDC	76	0.0
Harry S. Truman Reservoir	USCOE	72,001 (30,807)	N/A
Haysler Poague CA	MDC	889	0.0
James A. Reed Memorial WA	MDC	2,621	2.3
James R. Harter CA	MDC	453	1.2
Ladue Bottoms CA	MDC	347	0.9
Montrose CA	MDC	67	0
Montrose CA	KCPL	2,376 (2,376)	2.48
Settle's Ford CA	MDC	6,546	13.0
Truman State Park	MDNR	1,317	0.0
Urich Access	MDC	2	0.1
Urich CA	MDC	470	0.1
Missouri Department of Conservation	Total	13,281+(33,183)	21.3
South Grand Watershed	Total	88,975	20.58

Note: This table is not a final authority. Data subject to change.

¹Owner: MDC=Missouri Department of Conservation

MDNR=Missouri Department of Natural Resources

USCOE=United States Corps of Engineers

KCPL=Kansas City Power and Light

^{*}Acreages in parenthesis are leased by MDC.

Table Lu05. Percentages of state and federal public land ownership within eleven digit hydrologic units of the South Grand Watershed in Missouri.

Unit Name	MDC	MDNR	USCOE	Total
Upper South Grand	<0.1	0.0	0.0	<0.1
South Fork	2.4	0.0	0.0	2.4
East Branch South Grand	0.1	0.0	0.0	0.1
Upper Big Creek	3.1	0.0	0.0	3.1
Crawford Creek	0.0	0.0	0.0	0.0
Camp Branch	0.0	0.0	0.0	0.0
Middle South Grand	2.7	0.0	0.0	2.7
Honey Creek	0.0	0.0	0.0	0.0
Lower Big Creek	0.4	0.0	0.0	0.4
Truman Reservoir-Deepwater Creek	0.4	0.0	6.4	6.8
Truman Reservoir-Tebo Creek	0.2	0.0	9.4	9.6
Truman Reservoir-South Grand	0.6	0.9	29.4	30.9
South Grand Watershed Total	1.0	0.1	5.5	6.6

MDC=Missouri Department of Conservation

MDNR=Missouri Department of Natural Resources

USCOE=United States Corps of Engineers